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(71) Applicant(s)

Adrian Paul Heard
Dene Farm, Morwenstowe, BUDE, Cornwall,
EX23 9SL, United Kingdom

(72) Inventor(s)

Adrian Paul Heard

(74) Agent and/or Address for Service

Craske & Co
Patent Law Chambers, 15 Queens Terrace, EXETER,
EX4 4HJ, United Kingdom

(54) Bale wrapping machine

(57) The machine includes support wheels 3 for supporting the bale from below and rotating the bale about a substantially vertical axis. At the same time, one or more rolls 1 of wrapping sheet are carried about the bale in a substantially vertical plane by chains 7 or the like so that the bale is completely and evenly wrapped.

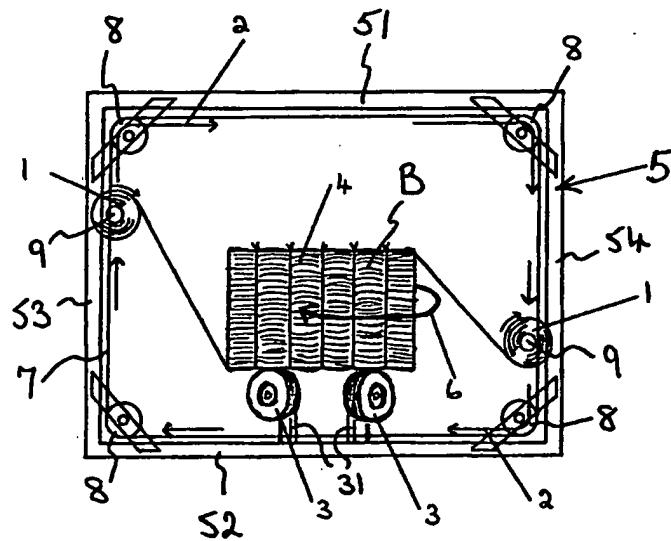


FIG 1

GB 2 287 926 A

1/2

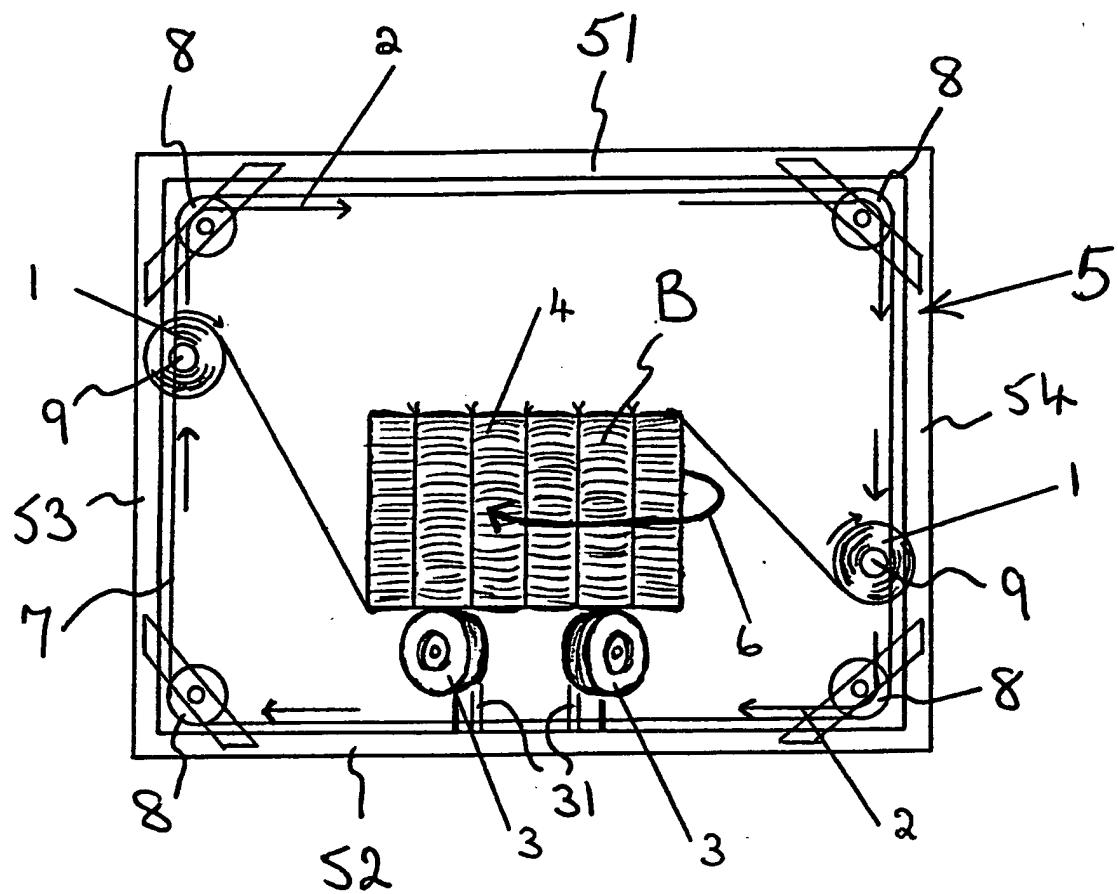


FIG 1

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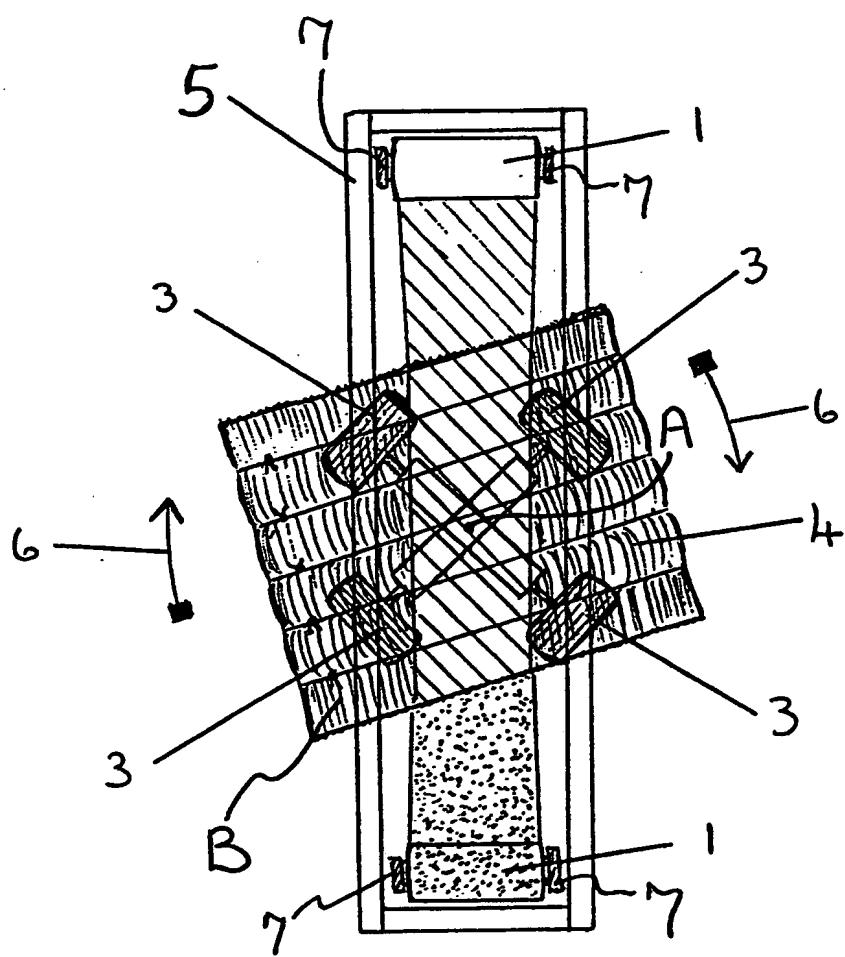


FIG 2

BALE WRAPPING MACHINE

TECHNICAL FIELD OF THE INVENTION

This invention relates to the agricultural industry, and particularly to machines for wrapping bales, including bales of the kind which are widely known as "big square bales" (which may be of square or rectangular section) and "round bales" (which are substantially cylindrical). The bales may be formed of hay, haylage, silage, straw and similar crops.

BACKGROUND

Bale wrapping machines are widely used. In general, these include rollers which support the bale and rotate it about a substantially horizontal axis whilst a roll of wrapping sheet is simultaneously rotated about the bale in a generally horizontal plane. As a result, the bale will eventually become completely wrapped.

Whilst such machines generally work well with round bales, which will roll smoothly about their axis, they are not very effective at wrapping square bales, and particularly those of rectangular shape, as they tend to flip over at intervals causing uneven or, worse still, incomplete wrapping. An even

covering is essential for successful crop storage.

US Patent No. 4 641 484 discloses a bale wrapping machine which rotates a bale around a vertical axis whilst supported on a turntable, with the roll or wrapping sheet located alongside the bale. However, this machine is unable to wrap the ends of the bale.

An aim of the present invention may be viewed as being to provide a bale wrapping machine which is capable of providing a substantially even wrapping on any shape of bale.

SUMMARY OF THE INVENTION

The present invention proposes a bale wrapping machine comprising

- support means for supporting the bale from below and rotating the bale about a substantially vertical axis, and
- a carrier for a roll of wrapping sheet which is mounted to move about the bale in a substantially vertical plane.

Although the bale could be wrapped to one side of the support means, the support means preferably includes a gap for passage of wrapping material unwound from the roll.

The support means preferably comprises a plurality of rotatable elements.

Although one roll carrier could be used, the machine preferably comprises a further carrier for a roll of wrapping sheet and which is mounted to move

about the bale in a substantially vertical plane.

BRIEF DESCRIPTION OF THE DRAWINGS

The following description and the accompanying drawings referred to therein are included by way of non-limiting example in order to illustrate how the invention may be put into practice. In the drawings:

Figure 1 is a diagrammatic side view of a bale wrapping machine of the invention, and

Figure 2 is a diagrammatic plan view of the machine.

DETAILED DESCRIPTION OF THE DRAWINGS

The machine includes a main frame 5 which is of generally rectangular shape and includes a top, a bottom and two sides 51, 52, 53 and 54 respectively. The bottom 52 supports an array of four support wheels 3 mounted on respective upstanding drive posts 31 on two mutually perpendicular horizontal axes and positioned equidistant from the point of intersection A of the two axes, as shown in Fig. 2. The upper faces of the wheels lie on a common substantially horizontal plane to support a bale 4 to be wrapped, and one or more of the wheels (preferably all four) are driven at equal speeds by any suitable means (e.g. the p.t.o of a tractor) so as to cause the bale to rotate about a substantially vertical axis passing through, or adjacent to, the point A.

A pair of endless chains 7, belts or the like are mounted on a series of guide pulleys 8 which are in turn fixed to the inside of the frame 5. One or more of the pulleys are driven to cause the chains to travel continuously around the inside of the frame in a substantially vertical plane. A pair of horizontal spindles 9 are carried by the chains 7 to move around the bale B in a substantially vertical plane, and carry rolls 1 of bale wrapping sheet film around the bale. The spindles 9 are spaced at equal intervals on the chains 7, although it will be appreciated that any convenient number of spindles and rolls could be used (e.g. one, three or more), and they are not necessarily equidistant, although equidistant spacing could be advantageous to balance the forces on the bale.

At the start of a wrapping process the ends of the film are unwound from the rolls and attached to the bale at any convenient starting point. Usually just poking the ends into the bale will provide a sufficient anchorage. When the wheels 3 are driven to rotate the bale about a vertical axis in the direction of arrows 6 the rolls of film are carried by the chains 7 about the bale in a vertical plane in the direction of arrows 2 so that the film unwinds from the rolls 1 onto the bale. It will be noted in Fig. 2 that the mutual spacing of the wheels 3 is such as to permit the film to pass between the wheels as the roll travels under the bale. When the drive ratio between the wheels 3 and the chains 7 is suitably set, the bale will be evenly covered with overlapping turns of the film until it is fully wrapped. The bale can then be removed from the machine for storage.

The machine works particularly well with big square bales since they are now turned evenly and consistently. In fact, the machine will evenly wrap any shape of bale having a flat surface for support on the wheels 3.

It will be appreciated that the wheels 3 could be mounted at differing distances from the point A, and other numbers of wheels could be used. Also, the wheels could be replaced by rollers, moving belts or the like.

* * * * *

CLAIMS

- 1. A bale wrapping machine comprising**
 - support means for supporting the bale from below and rotating the bale about a substantially vertical axis, and**
 - a carrier for a roll of wrapping sheet which is mounted to move about the bale in a substantially vertical plane.**
- 2. A machine according to Claim 1, in which the support means includes a gap for passage of wrapping material unwound from the roll.**
- 3. A machine according to Claim 1 or 2, in which the support means comprises a plurality of rotatable elements.**
- 4. A machine according to any preceding claim, which comprises a further carrier for a roll of wrapping sheet and which is mounted to move about the bale in a substantially vertical plane.**
- 5. A bale wrapping machine substantially as described with reference to the drawings.**

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Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

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(ii) Int Cl (Ed.6) A01F 15/07, B65B 11/04

Search Examiner
STEPHEN SMITH

Date of completion of Search
22 MAY 1995

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1 TO 5

(ii)

Categories of documents

X: Document indicating lack of novelty or of inventive step.	P: Document published on or after the declared priority date but before the filing date of the present application.
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.	E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A: Document indicating technological background and/or state of the art.	&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	WO 93/07059 A1 (KORSGAARD)	

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